

Claims

- [c1] In a system having a source node and a plurality of consumer nodes, a bandwidth-adaptive method for synchronizing a consumer node representation of a dynamic data set and the source node representation of the dynamic data set, the method comprising the steps of:
- (a) receiving from a source node metadata information identifying a plurality of data packets that represent a state of at least a portion of a changing data set at a point in time;
 - (b) receiving from the source node at least one of the identified data packets;
 - (c) selecting at least one of the received data packets responsive to the received metadata information;
 - (d) transmitting to a consumer node the metadata information; and
 - (e) transmitting to the consumer node the selected at least one data packet.
- [c2] The method of claim 1 further comprising the step of, before step (c), receiving a request from a consumer node for the current state of the changing data set.
- [c3] The method of claim 2 further comprising the step of re-

peating steps (a) and (b) until a request is received from a consumer node for the current state of the changing data set.

- [c4] The method of claim 3 wherein step (c) comprises the steps of:
 - (c-a) selecting one of the received metadata information; and
 - (c-b) selecting at least one of the received data packets identified by the selected metadata information.
- [c5] The method of claim 1 wherein step (c) comprises selecting a plurality of the received data packets responsive to the received metadata information.
- [c6] The method of claim 5 wherein step (d) comprises transmitting to a consumer node each of the selected plurality of data packets.
- [c7] The method of claims 1 wherein step (b) comprises receiving from the source node at least one of the identified data packets in encrypted form.
- [c8] The method of claim 1 further comprising the step of storing the received metadata information in a memory device.
- [c9] The method of claim 1 further comprising the step of

storing the received at least one data packet in a memory device.

- [c10] The method of claim 9 wherein step (c) comprises:
 - (c-a) selecting at least one of the received data packets responsive to the received metadata information; and
 - (c-b) selecting at least one of the stored data packets responsive to the received metadata information.
- [c11] The method of claim 10 where step (e) comprises:
 - (e-a) transmitting to the consumer node the selected at least one of the received data packets; and
 - (e-b) transmitting to the consumer node the selected at least one of the stored data packets.
- [c12] The method of claim 1 further comprising the step of storing, in a memory element, information identifying the at least one data packet transmitted to the consumer node.
- [c13] The method of claim 12 further comprising the step of selecting at least one of the received data packets responsive to the received metadata information and the stored information identifying the at least one data packet transmitted to the consumer node.
- [c14] A bandwidth-adaptive system synchronizing consumer node representations and a source node representation

of a changing data set, the system comprising:
a source node transmitting at least one metadata packet identifying a plurality of data packets that represent the current state of a changing data set and transmitting at least one of the identified data packets; and
a communications service in communication with the source node, the communications service selecting one of the at least one metadata packet and the at least one data packet for transmission to a first consumer node.

[c15] The system of claim 14 further comprising a first consumer node, wherein the first consumer node requests the current state of the changing data set from the communications service.

[c16] The system of claim 15 wherein the communication service selects one of the at least one metadata packet and the at least one data packet in response to the request made by the first consumer node.

[c17] The system of claim 15 further comprising a second consumer node, wherein the second consumer node requests the current state of the changing data set from the communications service.

[c18] The system of claim 17 wherein the source node transmits a plurality of metadata packets, each of the plurality

of metadata packets representing one state of the changing data set.

- [c19] The system of claim 18 wherein the communication service selects a first metadata packet to transmit to the first consumer node and a second metadata packet to transmit to the second consumer node.
- [c20] The system of claim 14 wherein the communications service further comprises a memory element.
- [c21] The system of claim 20 wherein the memory element is a persistent storage device.
- [c22] The system of claim 20 wherein the communications service stores the received at least one metadata packet in the memory element.
- [c23] The system of claim 20 wherein the communications service stores the received at least one data packet in the memory element.
- [c24] The system of claim 20 wherein the communications service stores in the memory element information regarding transmission of packets to a consumer node.
- [c25] The system of claim 14 wherein the source node encrypts the at least one data packet before transmission to the consumer node.

- [c26] A communications service synchronizing consumer node representations and a source node representation of a changing data set, the service comprising:
a receiving subsystem receiving at least one metadata packet identifying at least one data packet representing the current state of a changing data set and at least one data packet identified by the received at least one metadata packet;
a synchronization engine selecting one of the at least one metadata packet and the at least one data packet;
a transmission subsystem transmitting the selected one of the at least one metadata packet and the at least one data packet.
- [c27] The communications service of claim 26 further comprising a memory element.
- [c28] The communications service of claim 26 wherein the synchronization engine selects one of the at least one metadata packet and the at least one data packet in response to a request received from a consumer node.
- [c29] In a system having a source node and a plurality of consumer nodes, a bandwidth-adaptive method for synchronizing a consumer node representation of a dynamic data set and the source node representation of the dy-

namic data set, the method comprising the steps of:

(a) receiving from a source node first metadata information identifying a first plurality of data packets that represent a state of at least a portion of a changing data set at a first point in time;

(b) receiving from a source node second metadata information identifying a second plurality of data packets that represent a state of at least a portion of a changing data set at a second point in time;

(c) generating third metadata information representing the difference between the first set of identified data packets and the second set of identified data packets, the third metadata information identifying a third plurality of data packets;

(d) transmitting to a consumer node the third metadata information; and

(e) transmitting to the consumer node at least one of the identified data packets from the third plurality of data packets.